

What is claimed is:

1) A method of treating spinal disc defects comprising the steps of:

- 5                   a) preparing a disc treatment site;  
                  b) providing a substantially two-dimensionally shaped disc defect  
                  repair material; and  
                  c) inserting the repair material into the disc to be repaired.

10           2) The method of claim 1, wherein the substantially two-dimensionally  
shaped material is a strip.

3) The method of claim 1, wherein the substantially two-dimensionally  
shaped material is a circle.

15           4) The method of claim 1, wherein the disc repair material comprises a  
porous, biocompatible material.

20           5) The method of claim 4, wherein the bioabsorbable or non bioabsorbable  
material.

25           6) The method of claim 5, wherein the material is a bioabsorbable material  
selected from the group consisting of small intestine submucosa (SIS),  
collagen, hyaluronic acid, elastin, albumin, reticulin, synthetic polyamino  
acids, prolamines, polysaccharides, alginate, heparin, biodegradable  
polymers of sugar units, synthetic polymers including polylactide,  
polyglycolide, polydioxanone, polyhydroxybutyrate, polyhydroxyvalerate,  
poly(propylene fumarate), polyoxaesters, synthetic polyamino acids,

biodegradable polyurethanes and their copolymers, and combinations thereof.

7) The method of claim 6, wherein the bioabsorbable material is SIS.

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8) The method of claim 6, wherein the bioabsorbable material is collagen.

9) The method of claim 5, wherein the material is a non-bioabsorbable material.

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10) The method of claim 9, wherein, the non-bioabsorbable material is selected from the group consisting of polyacrylates, ethylene-vinyl acetates (and other acyl-substituted cellulose acetates), polyester (Dacron®), poly(ethylene terephthalate), polypropylene, polyethylene, polyurethanes, polystyrenes, polyvinyl oxides, polyvinyl fluorides, poly(vinyl imidazoles), chlorosulphonated polyolefins, polyethylene oxides, polyvinyl alcohols (PVA), polytetrafluoroethylenes, nylons, and combinations thereof.

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11) The method of claim 10, wherein the non-bioabsorbable material is polyester (Dacron®)

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12) The method of claim 1, wherein the step of inserting further comprises twisting the material being inserting into the disc.

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13) The method of claim 1, wherein the material is a strip and is bioabsorbable.

14) The method of claim 13, wherein the material is selected from the group consisting of SIS, collagen, hyaluronic acid, elastin, albumin, reticulin, synthetic polyamino acids, prolamines, polysaccharides, alginate, heparin, biodegradable polymers of sugar units, synthetic polymers including  
5 polylactide, polyglycolide, polydioxanone, polyhydroxybutyrate, polyhydroxyvalerate, poly(propylene fumarate), polyoxaesters, synthetic polyamino acids, biodegradable polyurethanes and their copolymers, and combinations thereof.

10 15) The method of claim 14, wherein the material is collagen.

16) The method of claim 14, wherein the material is SIS.

17) The method of claims 1-16, wherein the material is cell seeded.

15 18) The method of claim 17, wherein the cells are selected from stem cells, bone marrow cells, fibrocytes, adipocytes, chondrocytes, cells harvested from spinal discs in the body such as nucleus pulposus cells and annulus fibrosis, and combinations thereof.

20 19) The method of claim 18, wherein the cells are stem cells.

20) The method of claims 1-16, wherein the material is combined with an autologous medium prior to implantation.

25 21) The method of claim 20, wherein the autologous medium is selected from platelet-rich plasma, platelet-poor plasma, bone marrow, whole blood and serum.

22) The method of claim 20, wherein the autologous medium is bone marrow.

5 23) The method of claim 1-16 wherein the material further comprises a bioactive factor.

10 24) The method of claim 23 wherein, the bioactive agent is selected from the group consisting of transforming growth factor-beta and agents in the same family of growth factors, platelet-derived growth factors, fibroblast growth factors, insulin-like growth factors, protein polymers such as RGD-peptides and Indian Hedgehog proteins, anti-inflammatory agents, angiogenic factors, hormones, hyaluronic acid and combinations thereof.

15 25) The method of claim 24, wherein the bioactive factor is a transforming growth factor-beta selected from the group consisting of TGF- $\beta$ 1, TGF-  $\beta$ 2, and TGF- $\beta$ 3, GDF-5, MP52, and BMPs .

20 26) The method of claim 17 wherein the material further comprises a bioactive factor.

25 27) The method of claim 26 wherein the bioactive factor is selective form the group consisting of transforming growth factor-beta and agents in the same family of growth factors, platelet-derived growth factors, fibroblast growth factors, insulin-like growth factors, protein polymers such as RGD-peptides and Indian Hedgehog proteins, anti-inflammatory agents, angiogenic factors, hormones, hyaluronic acid and combinations thereof.

28) The method of claim 27 wherein the bioactive factor is a transforming growth factor-beta selected from the group consisting of TGF- $\beta$ 1, TGF-  $\beta$ 2, and TGF- $\beta$ 3, GDF-5, MP52, and BMPs .

5           29) The method of claim 18 wherein the material further comprises a bioactive factor.

30) The method of claim 29 wherein the bioactive factor is selective form the group consisting of transforming growth factor-beta and agents in the same family of growth factors, platelet-derived growth factors, fibroblast growth  
10           factors, insulin-like growth factors, protein polymers such as RGD-peptides and Indian Hedgehog proteins, anti-inflammatory agents, angiogenic factors, hormones, hyaluronic acid and combinations thereof.

15           31) The method of claim 30 wherein the bioactive factor is a transforming growth factor-beta selected from the group consisting of TGF- $\beta$ 1, TGF-  $\beta$ 2, and TGF- $\beta$ 3, GDF-5, MP52, and BMPs .

20           32) The method of claim 20 wherein the material further comprises a bioactive factor.

33) The method of claim 32 wherein the bioactive factor is selective form the group consisting of transforming growth factor-beta and agents in the same family of growth factors, platelet-derived growth factors, fibroblast growth  
25           factors, insulin-like growth factors, protein polymers such as RGD-peptides and Indian Hedgehog proteins, anti-inflammatory agents, angiogenic factors, hormones, hyaluronic acid and combinations thereof.

34) The method of claim 33 wherein the bioactive factor is a transforming growth factor-beta selected from the group consisting of TGF- $\beta$ 1, TGF-  $\beta$ 2, and TGF- $\beta$ 3, GDF-5, MP52, and BMPs .

5 35) The method of claim 21 wherein the material further comprises a bioactive factor.

36) The method of claim 35 wherein the bioactive factor is selective form the group consisting of transforming growth factor-beta and agents in the same family of growth factors, platelet-derived growth factors, fibroblast growth factors, insulin-like growth factors, protein polymers such as RGD-peptides and Indian Hedgehog proteins, anti-inflammatory agents, angiogenic factors, hormones, hyaluronic acid and combinations thereof.

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15 37) The method of claim 36 wherein the bioactive factor is a transforming growth factor-beta selected from the group consisting of TGF- $\beta$ 1, TGF-  $\beta$ 2, and TGF- $\beta$ 3, GDF-5, MP52, and BMPs .

20 38) The method of claim 22 wherein the material further comprises a bioactive factor.

39) The method of claim 38 wherein the bioactive factor is selective form the group consisting of transforming growth factor-beta and agents in the same family of growth factors, platelet-derived growth factors, fibroblast growth factors, insulin-like growth factors, protein polymers such as RGD-peptides and Indian Hedgehog proteins, anti-inflammatory agents, angiogenic factors, hormones, hyaluronic acid and combinations thereof.

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40) The method of claim 39 wherein the bioactive factor is a transforming growth factor-beta selected from the group consisting of TGF- $\beta$ 1, TGF-  $\beta$ 2, and TGF- $\beta$ 3, GDF-5, MP52, and BMPs .

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41) A method of treating spinal disc defects comprising the steps of:

- a) preparing a disc treatment site;
- b) manipulating a substantially two-dimensionally shaped disc defect repair material into a mushroom shape; and
- c) inserting the repair material into the disc to be repaired.

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